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ABSTRACT

This study was conducted at the State University of New York (SUNY) College at Buffalo to clarify the state of computer competence among elementary education majors. The impetus for the study was a local superintendent of schools' statement of his district's plans to employ teachers and administrators only if they demonstrate computer literacy. A survey of elementary education majors (N=324) was taken in 1989 and replicated in 1990 (N=284) to ascertain changes in computer competency. Frequency distributions were obtained for each of 15 questions. The results were disturbing in that over 50 percent of respondents had never used a microcomputer in any college course. More encouraging was the finding that education students recognized a need to develop greater computer competency to enhance professional productivity. SUNY (Buffalo) has implemented the following program to address the issue in a systematic fashion: (1) instructional computing exposure; (2) an elective instructional technology course offered in a computer laboratory to teach education majors word processing, data base management, spreadsheet manipulation, chart development, and communications, and methods for integrating these skills into classroom instruction; and (3) training faculty members in education departments who lack expertise in the instructional use of technology. The survey form is attached. (LL)

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A Profile of Undergraduate Educational Technology (In)Competence: Are We Preparing Today's Education Graduates for Teaching in the 1990's?

John F. Beaver

Statement of Problem

Faculty in the colleges of education across the country are charged with helping the teachers of tomorrow develop the varied skills necessary for teaching in the 1990's. Our students must develop the skills and understandings necessary to find teaching positions today to be successful in the classrooms of tomorrow. Although our colleges of education are generally doing a good job in preparing students for the teaching profession, in developing a key competency like the ability to use computers educationally, we are not doing well at all. Judith Axler Turner asserts that, despite the importance of educational computing, "few colleges of education have incorporated computers into their curricula."[4] Dave Moursund (1989) is even more emphatic in his criticism: "by and large our colleges of education are doing a miserable job of preparing teachers to deal with the Information Age."[2]

Part of the reason that our colleges of education are doing a "miserable job" is that the faculty members in the education departments lack expertise in the instructional use of technology. If we expect faculty to provide the vision and understanding needed to guide the development of instructional computing programs, we must encourage them to increase their computer competence. As Sylvia Charp argues: "It is generally agreed that more still needs to be done in faculty development if we expect truly broad use of technology in teaching and learning to occur."[1]

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Any plan we develop to better prepare of education graduates must include a technology mastery component designed for our education faculty.

Clearly, many of us are becoming aware that prospective teachers need additional training in educational computing. But how computer competent are America's experienced teachers? Len Scrogan points out that "the vast majority of teachers today have little or no training in the use of the new technologies."[3] Scrogan also reports an Office of Technical Assistance conclusion that "if technology is to take hold in schools, teachers will need more 'how-to' training." It is tempting to appease ourselves with the thought that although education graduates are not prepared for technology use, neither are their future colleagues. If the majority of experienced teachers are not able to use computers instructionally, then how important can computer competence be for beginning teachers? However, we may be deluding ourselves if we believe our neophytes will gain the necessary technology skills through "on-the-job" training.

Such on-the-job computer experiences may occur, but many school districts feel they cannot afford the price of providing costly computer training for their staffs. Instead, many districts are adopting cost effective approaches to solving the problem of increasing the computer competence of their staffs. In a 1989 open letter to SUNY Chancellor Bruce Johnstone, Long Island Superintendent of Schools Henry P. Reed stated that his district plans to "**employ teachers and administrators only if they demonstrate computer literacy** [in word processing, spreadsheets, graphing, and data bases]. **Candidates who have this technical training will be hired**; those who do not face rejection."

Of course, it is impossible to get "on-the-job" training if you can't get the job! The ability to use a computer effectively is rapidly becoming an important prerequisite for finding a teaching position. Computer competence is an important skill for all education graduates. Are they developing it in their pre-service programs? Are our education majors developing the necessary computer competence on their own? Is there a need for formal educational computing instruction? During the Fall semester in 1989, the more than 300 elementary education majors at SUNY College at Buffalo were surveyed to determine their present level of computer competence.

Conceptual Framework:

The study was undertaken to clarify the extant state of computer competence of the elementary education majors at SUNY College at Buffalo. It was hoped the data gathered during the study would end speculation regarding the students' technology competence levels and help ensure that whatever plans are developed to address the situation will be based on the actual needs of the students.

Some individuals claim that education majors are gaining the necessary technology skills on their own initiative or from courses offered by other departments including computer science and technology. The study sought to confirm or deny those claims and to gather hard data upon which appropriate plans could be based.

Methodology:

In October, 1989, I surveyed the more than 300 junior and senior elementary education majors (n=324) at SUNY College at Buffalo to determine their present level of computer competence. The survey was administered during class sessions of the students' methods courses. Respondents were guaranteed their anonymity and, as a result, all students were willing to participate. The survey responses were recorded on standardized answer sheets which were machine scored. In October, 1990, I replicated the study (with a slightly smaller sample—n=284) to ascertain any changes in their levels of computer competence.

Frequency distributions were obtained for each of the fifteen questions. (See the attached copy of the survey instrument listing the survey findings). The figures for the 1989 study are listed first in outline digits, the 1990 results are listed second in ***italicized, shadow digits*** to help differentiate the two data sets. The reporting techniques are purely descriptive since the purpose of the study was to identify the computer competence levels of our elementary education majors.

Findings, Conclusions, and Implications

Many of the findings from both studies are disturbing. Although the 1990 figures do indicate a gradually improving situation, there is still a great deal of work to be done. In 1989, nearly one-quarter (22%) of the students had <u>never</u> used a microcomputer—not at home, not at a friend's house, not in school, and not in college. This year, 18% still have not done

so. Ten years ago, that finding would not have been surprising, but, in 1990, it is cause for particular concern.

In addition, in 1989 more than two-thirds (68%) had never used a microcomputer in any college course. That figure has dropped to slightly more than half (54%) in 1990. That is a significant improvement, but it is still totally unacceptable. We know that students tend to model the methods they were taught; appropriate instructional use of technology was not part of the model that 54% of them experienced. More over, more than half of the students (53%) rate their ability to use the microcomputer as a productivity tool as either "Low" or "Nonexistent." These discouraging results reinforce Moursund's remark—we <u>are still</u> doing a miserable job of preparing our graduates for using computers.

Somewhat more comforting is the finding that students recognize the absence of technology training in their professional preparation and want to correct it. Three students in five (60%) rate learning to use the microcomputer more effectively as either "A Top Priority" or "Very Important" to them. Nearly all the students (86%) hope to have instruction that improves their use of the microcomputer. Education majors recognize their need to develop greater computer competence—even if the faculties of colleges of education have not yet done so.

The present level of support for educational technology that many of our colleges of education are providing must change. The faculties in colleges of education across the country must insist on adequately preparing their graduates for the new demands of the teaching profession. Demonstrable computer competence is rapidly becoming a key

consideration for teacher employment—as the open letter from Superintendent of Schools Henry P. Reed attests. We must explore ways to help our majors develop important technology-use competencies. At SUNY College at Buffalo, we are planning to address the issue in a systematic fashion.

In the short-term—Fall semester, 1990—we are offering our undergraduate elementary education majors instructional computing "exposure," as part of their departmental education methods courses. These exposure sessions are provided as "show-and-tell" sessions, conducted by elementary education faculty skilled in the educational use of technology. In addition, faculty are being given training sessions to increase their technological competence. These sessions are designed to help the faculty develop the expertise they'll need to teach their students how to integrate technology into their instructional approaches in the different content areas. At the same time, the elementary education majors are being furnished with voluntary productivity tool workshop sessions to help them increase their levels of technology competence.

In the middle-term—by the Spring semester of 1991—we intend to provide an elective instructional technology course as one of our undergraduate offerings. This goal is achievable, at least partially, because of the involvement of the IBM Corporation in a study designed to improve the quality of elementary education in the state of New York. IBM has begun a state-wide initiative in New York aimed at both K-6 and higher education settings. As part of that initiative, the Elementary Education Department at SUNY College at Buffalo is receiving a fully equipped, networked computer lab.

Because of our involvement in the IBM study, the Elementary Education Department now has the essential "cutting-edge" hardware and software needed to conduct the course appropriately. With this computer laboratory as the training site, we can provide an elective course to help our majors use technology to enhance their professional productivity. The primary mission of the elective is to help our education majors master word processing, data base management, spreadsheet manipulation, chart development, and communications to enhance their own productivity. In addition, we will also introduce students to methods for integrating these productivity tools into their classroom instruction. Eventually, we will explore the implications of requiring this instructional computing elective as part of our undergraduate program, making it a prerequisite for the methods courses.

Preparation of this type serves two purposes. First, it will give students a solid foundation for further exposure to instructional uses of technology in content areas during methods courses. Second, it will provide students with the skills necessary to compete in the "educational marketplace." The productivity skills that the students will develop in the course will help them enhance the effectiveness of their performance in all of their professional undertakings.

Finally, in the longer term, we must prepare our education faculty to integrate technology use within their methods courses. Once students acquire the necessary fundamental skills in the technology competence course, they must have opportunities to apply the skills in specific instructional settings in all the separate content areas. Those opportunities

will result from the guidance that students are given during their elementary education methods courses. That guidance must be provided by a knowledgeable and competent education faculty. Our involvement in the IBM initiative will ensure that our elementary education faculty have the necessary materials and training to that accomplish that goal.

If the plan is to achieve its goals, one critical ingredient is not yet determined. That element is the essential human factor—the willingness of the education faculty to devote the time and energy needed for them to master the instructional use of technology. Clearly, the necessary faculty commitment can be encouraged by appropriate administrative action. One such action certain to encourage faculty commitment is to make the instructional use of technology a key consideration in personnel issues including tenure and discretionary salary determinations. If faculty see comparable administrative support for adopting the instructional use of technology that they see for scholarship and teaching effectiveness, many of them will soon make the effort needed to master the technology.

The plan can achieve its goals if the education faculty will make the commitment necessary to make it work. Now is the time to improve the technological competence of our preservice teachers. For that to happen, we need plans that address the present, the immediate future, and the longer term. Our plans for the Elementary Education Department of the SUNY College at Buffalo address these three time frames. All three phases of the plan are important for achieving the eventual goal of preparing students for their roles as teachers in the 1990's and beyond.

References

1. Charp, Sylvia. "Editorial." Electronic Learning. p. 3. June, 1989.

2. Moursund, Dave. "Why Are Our Colleges of Education Continuing to Graduate Computer Illiterate Teachers?" The Computing Teacher, vol. 16, p. 9. June, 1989.

3. Scrogan, Len. The OTA Report: Teachers, Trainers, and Technology. Classroom Computer Learning. January, 1989.

4. Turner, Judith Axler. Teacher-Training Colleges' Slow Move to Computers Blamed for Schools' Lag in Integrating Technology. The Chronicle of Higher Education. July 19, 1989.

1990 Buffalo State College Survey
Elementary Education Department
Undergraduate Computing Experience

1989 data are listed 1st in outline digits.
1990 data are listed 2nd in italic, shadow digits.

1] Have you ever used a microcomputer?

a) Yes 78%, *82%* **b) No** 22%, *18%*

2] Would you like to have instruction designed to increase your ability to use a microcomputer more effectively?

a) Yes 94%, *86%* **b) No** 6%, *14%*

3] How important to you is learning to use computers more effectively?

a) Top priority 10%, *10%* **b) Very** 51%, *50%*
c) Somewhat 37%, *38%* **d) important** 2%, *2%*

4] Have you ever used a computer in a course at SUNY College at Buffalo?

a) Yes 32%, *46%* **b) No** 68%, *54%*

5] Did you ever take a class where you were taught to use computers?

a) Yes 52%, *55%* **b) No** 48%, *45%*

6] If you were taught to use a computer, at what level did the instruction occur? Mark all that apply. {Raw data, not percentages}

a) Elementary 9, *3* **b) Junior High** 11, *10*
c) Senior High 62, *57* **d) College** 80, *85*

7] Have you ever received <u>training</u> in computer usage as part of any course at Buffalo State College? (If you answer no, skip questions 8 & 9)

a) Yes 23%, *37%* **b) No** 77%, *63%*

8] Have you ever received training in computer usage as part of any education course at Buffalo State College? (If you answer no, skip questions 8 & 9)

a) Yes 13%, 17% **b) No** 87%, 83%

9] How would you rate your ability to use a computer as a productivity tool to help you work more effectively?

a) High 6%, 13% **b) Medium** 31%, 34%
c) Low 41%, 39% **d) Nonexistent** 22%, 14%

10] How would you rate your ability to use a computer as a teaching tool?

a) High 4%, 4% **b) Medium** 16%, 23%
c) Low 36%, 42% **d) Nonexistent** 44%, 31%

11] Do you own a microcomputer?

a) Yes 17%, 23% **b) No** 83%, 77%

12] If you answered "No" to question 11, do you plan to buy a microcomputer in the near future? {Raw data, not percentages}

a) Yes 65, 82 **b) No** 187, 137

13] Do you now use a computer to help you complete class work?

a) Yes 29%, 38% **b) No** 71%, 62%

14] If you now use a computer to help you complete your class work, which computer system do you use? {Raw data, not percentages}

a) Apple II 30, 27 **b) IBM compatible** 56, 69
c) Macintosh 1, 4 **d) Other** 24, 30

15] Which of these computer applications do you use? (Mark all that apply)

a) Word processing 25%, 14% **b) Data bases** 6%, 24%
c) Spreadsheets 1%, 1% **d) Graphing** 3%, 11%
e) None 67%, 56%